

## SUCTION STYLET FOR USE WITH AN ENDOTRACHEAL TUBE

### CROSS REFERENCES

This application corresponds with Disclosure Document No. 340716 filed in the U.S. Patent and Trademark Office on Oct. 13, 1993. This Disclosure Document is incorporated herein by reference.

### FIELD OF THE INVENTION

The present invention relates to a suction stylet for use with an endotracheal tube. More specifically, the present invention is directed at a suction stylet which is adapted for connection with an endotracheal tube and which has means for controlling the application of suction at the inserted end of an endotracheal tube.

### BACKGROUND OF THE INVENTION

In many medical situations it is important to maintain a clear breathing passageway such that oxygen is continuously supplied to the brain. Maintenance of the clear passageway is often achieved through the placement of an endotracheal tube into the trachea such that an uninterrupted passageway exists between the patient's lungs and the oxygen environment. To facilitate insertion of an endotracheal tube, a doctor, paramedic or other medical professional will often rely on a laryngoscope blade which is inserted down the patient's throat and helps the treating person properly position the endotracheal tube.

Even with the help of the laryngoscope blade, however, it is often still difficult to properly insert the endotracheal tube due to vomit, oral secretions and blood blocking the inserter's vision. In an effort to overcome this problem, medical personnel often first insert suction tubes prior to insertion of the endotracheal tube. This additional insertion of a suction tube increases the time involved in the proper placement of the endotracheal tube. This added time presents a serious health risk as often the insertion of the tube within the minimum time possible is desirable to avoid anoxia. Moreover, even when the suction tube is first inserted, it is possible for the vision blocking fluids and debris to return between the time of suction tube removal and endotracheal tube insertion.

U.S. Pat. No. 5,257,620 describes an apparatus and method for endotracheal tube intubation which features an endotracheal tube with a suction stylet telescopically disposed therein and releasably fixed to the endotracheal tube. This tube is connected to a suction source such that when the suction source is operating fluid is drawn up continuously into the open end of the stylet. Thus, suction forces can be present during insertion of the tube and stylet combination, following insertion of the combination, and during removal of the suction tube. The presence of a suction at the tip of the combination throughout the insertion stage of the introduction process is problematic from the standpoint that there are times when it is desirable not to have suction during that stage. For instance, when the endotracheal tube and stylet are placed between the vocal cords and into the larynx, there is the danger of damaging the cords and other structures if suction is placed on them and the endotracheal tube and stylet are then advanced or retracted.

## SUMMARY OF THE INVENTION

The present invention is directed at a suction stylet for use with an endotracheal tube that not only avoids the requirement of inserting a tonsil suction instrument and an endotracheal tube at different times, but also allows an operator to control with precision the periods within which suction is provided at the free end of the suction stylet. The present invention also avoids having to utilize the semi-rigid piece of metal (often referred to as a stylet) that is used to aid in shaping the otherwise highly, flexible limp endotracheal tube.

In addition, the suction can be controlled easily and without distracting the inserter of the endotracheal tube. Further, insertion of both the tube and stylet can be done without blocking the view of the person inserting the combination of endotracheal tube and suction stylet. Furthermore, the present invention provides an improved holding area which allows for easy manipulation of the stylet and avoids the development of torsion in the suction tube leading to the stylet due to twisting of the suction tube line.

The present invention features a suction stylet that has a main body with a first end, a second end and an internal passageway extending between the first and second ends. The main body further comprises a suction fitting at the first end that is adapted for connection with a suction source and is positioned such that the internal passageway is in fluid communication with the suction source. The main body also includes a connector member at the second end which is adapted for connection with an endotracheal tube. The suction stylet also includes a suction stylet extension or lumen extending off of the second end of the main body. The suction stylet extension is adapted for insertion into the endotracheal tube and has an internal conduit which opens out at its free end. The opposite end of the suction stylet extension is positioned so that its internal conduit is in fluid communication with the internal passageway in said main body.

The suction stylet also features a vent arm that extends off from the main body. The vent arm has a first end or base connected with said main body and a second, free end spaced from the first end. The vent arm further includes a vent passageway extending between the first and second ends of said vent arm. A vent port that opens into the vent passageway is provided near the free end of the vent arm. The vent passageway opens into the internal passageway in a manner which avoids obstructing the flow of fluids and other suctioned materials travelling within the internal passageway. For example, the edge defining the end of the vent passageway opening into the internal passageway is flush with the surface defining the internal passageway and the passageway extends at an acute angle in a direction opposite to the suction flow.

The main body and suction stylet extension are arranged such that the internal passageway of the main body and the internal conduit of said suction stylet extension have a common central axis at their point of connection. The passageways also have the same diameter at least at their point of connection and are either straight or smoothly curved so that fluids and debris can easily pass through the stylet to an appropriate waste site.

The natural state of an endotracheal tube is slightly curved; however, the suction stylet of the present invention has no real natural state as it is formed of a malleable material which retains whatever shape given to it. Preferably, the stylet is provided with essentially the same shape as the endotracheal tube to facilitate insertion. The main